Fact Sheets

SRS

TNX Area Operable Unit

Background

This unit is bounded by Upper Three Runs to the north and Fourmile Branch to the south. The TNX Area Operable Unit consists of four major subunits: the New TNX Seepage Basin, the TNX Burying Ground, the Old TNX Seepage Basin, and the TNX Groundwater.

The TNX Area was an industrial facility where pilot-scale testing and chemical process evaluation facility for fuel and target manufacturing, Separations Areas, and the Defense Waste Processing Facility (DWPF) took place. From the mid-1950s until 1980, wastewater from the area was discharged through a now inactive process sewer line to the Old TNX Seepage Basin (OTSB). In 1980, area wastewater was rerouted from the OTSB to the New TNX Seepage Basin (NTSB) through a now inactive process sewer line. The OTSB was closed and backfilled with clean soil in 1981. In 1988, discharges to the NTSB were rerouted to the TNX Effluent Treatment Plant (ETP).

Process-related debris from an explosion in an experimental evaporator containing uranyl nitrate was also buried at the unit in 1953 in four unlined trenches at depths of 6-10 feet below ground surface in an area that became known as the TNX Burying Ground (TBG). Between 1982 and 1984, during an expansion of the TNX facilities, the majority of the burial waste was excavated and moved to the SRS Radioactive Waste Burial Ground. Five small areas were not excavated because they were located under buildings, transformers, and other above ground structures. Much of the available ground surface is covered with asphalt.

In August 1996, a suspected area of contamination containing three metal drums was discovered adjacent to the TNX Burying Ground. One drum contained job control wastes such as incandescent light bulbs, lead strips, adsorbent material, sample vials, and rubber gloves. The other drums contained soil-like materials. Radionuclides and metals were detected in each drum. The drums and adjacent soils were removed from the area. The area was characterized thoroughly and no soil contamination was detected.

Environmental Concerns

Sampling data from a network of monitoring wells indicates that seepage from the unlined basins and leachate from other activities in the area has resulted in soil and groundwater contamination throughout the TNX Area OU.

An estimated 0.02 curies of uranyl nitrate remains buried at the five TBG contaminated areas that could not be excavated. However, none of the current soil exposure scenarios indicate an unacceptable cancer risk, and there are no final human health contaminants of concern for any exposure scenario.

Characterization of the TNX Area OU has also shown the primary groundwater contamination to be chlorinated volatile organic compounds (CVOCs), predominantly trichloroethylene (TCE), tetrachloroethylene (PCE), and carbon tetrachloride. The CVOC plume underlies eight acres and has a maximum thickness of 20 feet. Characterization activities indicate that the contamination is limited to the shallow water table aquifer and is outcropping to the TNX swamp before it reaches the Savannah River. No contamination from the facility has been detected in the river.

Groundwater monitoring has also indicated the presence of two distinct areas with elevated radioactivity levels. The elevated radioactivity in the "Lower Area," located at the western edge of the inner Savannah River Swamp, appears to be associated with uranium. The elevated levels in the "Upper Area," located due west of the TBG, appear to be primarily attributable to radium-226. Based on the present data, SRS, the U.S. Environmental Protection Agency (USEPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) concur that these levels of radionuclides do not currently warrant action. However, additional sampling and radiological studies are being conducted to address any uncertainties associated with that conclusion.

Groundwater monitoring has also identified a small region with slightly elevated levels of mercury contamination and no discernable source.

Environmental Actions and Plans

In 1994, an Interim Action Record of Decision (IROD) was approved by USEPA and SCDHEC. The IROD mandated that an interim remedial action be initiated within 15 months of the signing of the IROD. The objectives of the interim action are to:

- Reduce potential risk to human health and the environment
- Maintain acceptable levels of risk to the onsite worker at the seepline
- Remove the VOC contamination in the groundwater near the plume core
- Stabilize the plume by inhibiting migration of elevated levels of VOCs (500 parts per billion (ppb) TCE) to the swamp
- Prevent further aquifer degradation

The remedy selected for accomplishing the Interim Remedial Action goals was designated the Hybrid Groundwater Corrective Action (HGCA) system. The HGCA system had two components: 1) a traditional pump and treat technology, and 2) an innovative in-situ technology, airlift recirculation well.

The pump and treat system, a proven technology for groundwater remediation, was installed to treat and inhibit further migration of the 500 ppb dissolved VOC plume. The system consists of four recovery wells and a low profile air stripper. The recovery wells are designed to feed the air stripper at a rate of 80 gallons per minute; an associated purge water station feeds an additional 20 gallons per minute.

The recirculation well, considered an innovative technology at the time, was located at the heart of the plume for the purpose of expediting the remediation. Based on testing performed in 1996, a determination was made that the recirculation well was ineffective in removing contaminants. Site-specific conditions (the existence of a low permeability layer between the upper and lower screens) precluded the establishment of the required "recirculation cell". Consequently, an Explanation of Significant Differences was issued in 1997, and further operation of the recirculation well at TNX was discontinued.

SRS determined the pump and treat system would adequately meet the groundwater remedial objectives of the IROD. An Explanation of Significant Differences was issued in October 2001 to install and operate an active and passive Soil Vapor Extraction (SVE) system in the TNX Burying Ground vadose zone. The active SVE system will operate until an assessment determines that a transition to a passive technology either barometric pumping or microblowers is appropriate.

A combined Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation and Baseline Risk Assessment was approved in 1999. The Corrective Measures Study/Feasibility Study (CMS/FS) was approved in June 2002 and the Statement of Basis/Proposed Plan (SB/PP) approved in January 2003. A Rev. 0 Record of Decision (ROD) was submitted in March 2003. Upon receipt of the regulatory agencies' approval of the ROD, SRS will complete the Remedial Action Plan and start the scheduled field construction activities in September 2004.